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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TIMORY, KABIR A

ART UNIT

PAPER NUMBER

2611

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DELIVERY MODE

01/29/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/524,203	Applicant(s) OZEKI ET AL.	
	Examiner KABIR A. TIMORY	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 November 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. This office action is in response to the amendment filed on 11/03/2009. Claims 1-11 are pending in this application and have been considered below.
2. The claim objection to claim 7 is corrected by the amendments; therefore, the objection is withdrawn.
3. The correction of figure 5 and the applicant's arguments with respect to claim 1 and have been considered but are moot in view of new ground(s) of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. (US 6075829) in view of Paneth et al. (US 4862107) and further**

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in view of Applicant's Admitted Prior Art (AAPA) (figure 5, specification, page 1, lines 10-27, and page 2, lines 1-2).

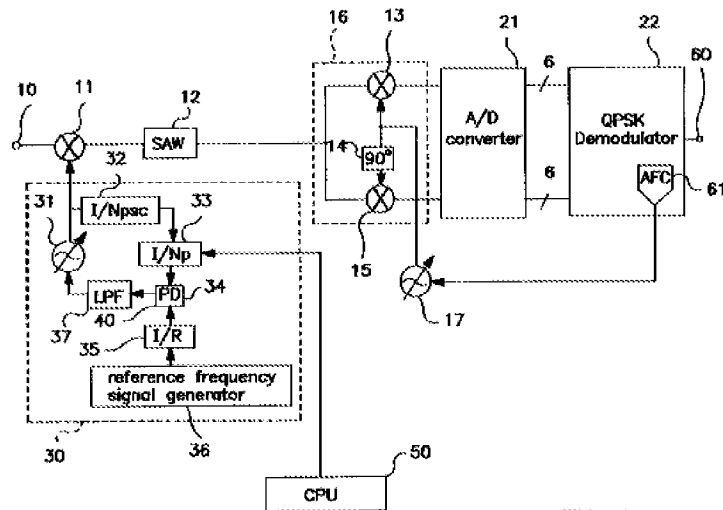


FIG. 1

Regarding claim 1:

As shown in figures 1-16, Hayashi et al. disclose a digital signal receiver
(abstract) comprising:

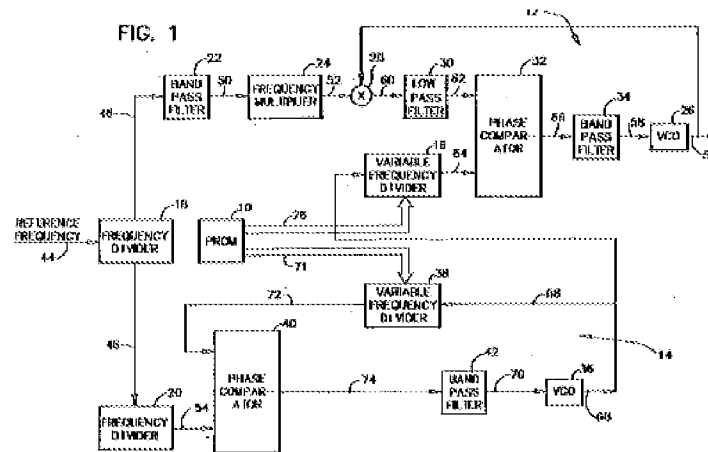
- a reference signal generator (36 in figure 1) for generating a first reference signal (col 5, lines 5-7);
- a base band transform circuit (16 in figure 1) for converting a first high-frequency signal with digital modulation into a base band signal with using the first reference signal (On page 3 of the specification of the instant application, lines 9-14, the applicant discloses: "Base-band orthogonal transform circuit 3 converts a frequency of the intermediate frequency signal output from frequency converter 2 into base-band orthogonal signals including base-band I signal 14 and base-band Q signal 15 with using the reference signal generated by reference signal generator 1". In figure 1, Hayashi et al. clearly shows that orthogonal detector 16 is receiving the IF signal output from the frequency

converter 11 via filter 12 and convert the received IF signal into in-phase (I) and quadrature (Q) base-band signal (see col 4, lines 35-43). Therefore, the examiner makes his broadest reasonable interpretation in light of the specification that the orthogonal detector 16 of Hayashi et al. to be the base band transform circuit); and

- wherein the first reference signal is generated independent of the signal output of the frequency multiplier (**figure 1 shows that the reference signal is generated independently**).

Hayashi et al. discloses all of the subject matter as described above except for specifically teaching a frequency divider to divide a frequency of the first reference signal; a frequency multiplier wherein an output frequency of the frequency multiplier is a product of a multiplicand value which is the divided frequency of the first reference signal produced by the frequency divider and a multiplier value of the frequency multiplier.

However, Paneth et al. in the same field of endeavor teaches a frequency divider (**18 in figure 1**) to divide a frequency of the first reference signal (**44 in figure 1**); a frequency multiplier (**24 in figure 1**) wherein an output frequency of the frequency multiplier (**52 in figure 1**) is a product of a multiplicand value (**multiplying the frequency of the signal by nine is interpreted to be the multiplicand value**) which is the divided frequency of the first reference signal (**44 in figure 1**) produced by the frequency divider (**18 in figure 1**) and a multiplier value (**multiplying the frequency of the signal by nine is interpreted to be the multiplicand value**) of the frequency multiplier (**24 in figure 1**) (col 3, lines 10-29).

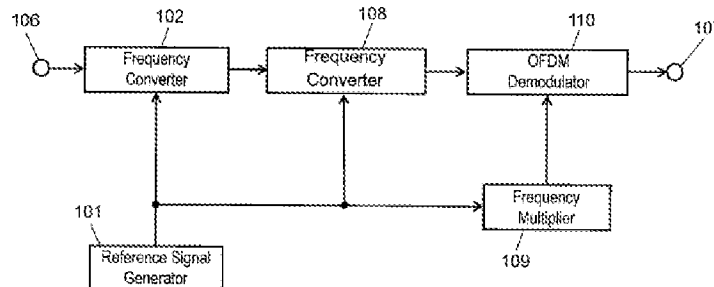


Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use a frequency divider at the input of a frequency multiplier as taught by Paneth et al. to combine and modify the system and method of (AAPA) in order to divided signal at a predetermined frequency and to provide a frequency reference signal at a predetermined frequency.

Although Hayashi et al. discloses a digital demodulator (**22 in figure 1**) to demodulate a signal output from the base band transform circuit (**16 in figure 1**), he fails to teach to demodulate with using the signal output from the frequency multiplier as a reference signal.

However, AAPA et al. in the same field of endeavor teaches to demodulate **(110 in figure 5)** with using the signal output from the frequency multiplier **(109 in figure 5)** as a reference signal **(see figure 5)**.

FIG. 5 PRIOR ART



Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use a frequency multiplier as taught by AAPA to combine and modify the system and method of Hayashi et al. in order to convert the frequency of the reference signal.

Regarding claim 2:

Hayashi et al. further discloses a frequency converter (**11 in figure 1**) for receiving a second high-frequency signal modulated by the digital signal and converting a frequency of the second high-frequency signal to generate the first high-frequency signal (**col 4, lines 33-52**).

Regarding claim 3:

Hayashi et al. further discloses wherein the frequency converter converts the second high-frequency signal into the first high-frequency signal with using the first reference signal (**figure 1 shows that frequency converter 11 uses the reference signal provide by the reference signal generator 36. See figure 1 above**) (**col 4, lines 33-52**).

Regarding claim 4:

Hayashi et al. and Paneth et al. disclose all of the subject matter as described above except for specifically teaching wherein the first high-frequency signal is modulated by the digital signal by Orthogonal Frequency Division Multiplexing system, and the digital demodulator comprises an Orthogonal Frequency Division Multiplexing demodulator.

However, AAPA et al. in the same field of endeavor teaches wherein the first high-frequency signal is modulated by the digital signal by Orthogonal Frequency Division Multiplexing system **(110 in figure 5)**, and the digital demodulator comprises an Orthogonal Frequency Division Multiplexing demodulator **(specification, page 1, lines 10-27, and page 2, lines 1-2)**. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use a Orthogonal Frequency Division Multiplexing demodulator as taught by AAPA to combine and modify the system and method of Hayashi et al. in order to demodulate high-frequency signal digitally.

Regarding claim 5:

Hayashi et al. further discloses wherein the base band transform circuit **(16 in figure 1)** comprises an orthogonal base band transform circuit **(13-15 in figure 1)** operable to convert the first high-frequency signal into a first base band signal **(in-phase I component)** and a second base band signal **(Quadrature Q component)** orthogonal each other and output the first base band signal and the second base band signal **(col 4, lines 35-52)**.

Regarding claim 6:

Hayashi et al. further discloses wherein the orthogonal base band transform circuit includes a 90°-phase shifter for shifting a phase of the first reference signal by 90 degrees (**14 in figure 1 provides 90° phase shift for the system**), a first mixer (**13 in figure 1**) for mixing the first reference signal with the first high-frequency signal to convert the first high-frequency signal into the first base band signal, and a second mixer (**15 in figure 1**) for mixing the second reference signal with the first high-frequency signal to convert the first high-frequency signal into the second base band signal (**col 4, lines 35-52, col 5, lines 22-36**).

Regarding claim 9:

Hayashi et al. disclose all of the subject matter as described above except for specifically teaching a low-pass filter for receiving a signal output from the frequency divider and outputting a signal to the frequency multiplier.

However, Paneth et al. in the same field of endeavor teaches a low-pass filter (**22 in figure 1**) for receiving a signal output from the frequency divider (**18 in figure 1**) and outputting a signal to the frequency multiplier (**24 in figure 1**). *Although, block 22 of figure 1 shows band pass filter, however, it would have been obvious to one of ordinary skilled in art to substitute the band pass filter with a low-pass filter to obtain a predictable result*). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use the filter as taught by Paneth et al. to combine and modify the system and method of (AAPA) in order to minimize phase noise and electronic noise of the system (see col 1, lines 50-53).

Regarding claim 10:

(AAPA) further discloses a further device including the digital demodulator **(110 in figure 5)** and the frequency multiplier **(109 in figure 5)**.

6. Claims 7-8 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. in view of Paneth et al. and Applicant's Admitted Prior Art (AAPA) as applied to claim 1 above and further in view of Lee et al. (US 20010048715).

Regarding claims 7 and 11:

Hayashi et al., Paneth et al., and AAPA et al. discloses all of the subject matter as described above except for specifically teaching wherein the frequency divider and at least one of the base band transform circuit and the frequency converter are formed in a bi-COMOS device.

However, Lee et al. in the same field of endeavor teaches wherein the frequency divider and at least one of the base band transform circuit and the frequency converter are formed in a bi-COMOS device **(par 0007)**. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use bi-CMOS device as taught by Lee et al. to combine and modify the system and method of (AAPA) in order to provide better speed and noise characteristics.

Regarding claims 8 and 10:

AAPA et al. further discloses wherein the digital demodulator (**110 in figure 5**) and the frequency multiplier are formed in a CMOS device (**par 0008-0009**). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use CMOS device as taught by Lee et al. to combine and modify the system and method of (AAPA) in order to reduce the cost, size and power consumption (par 0005)

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KABIR A. TIMORY whose telephone number is (571)270-1674. The examiner can normally be reached on 6:30 AM - 3:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kabir A Timory/

Examiner, Art Unit 2611

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611